SUPPORT FOR THE AMENDMENTS

Claims 1-27 and 44 were previously canceled.

Claim 46 is canceled herein.

Claims 28, 45, 47, 48, and 50 are amended.

The amendment to Claims 28, 45, 47, 48, and 50 is supported by the previously presented claims and the original specification as filed. Specific mention is made of Claim 46 for the amendment of Claim 28.

No new matter has been added by the present amendments.

REMARKS

Claims 27-43, 45, and 47-50 are pending in the present application.

The rejections of:

(a) Claims 28-34, 36-40, 42, 45, 46, 48, and 50 under 35 U.S.C. §103(a) over Hochsmann (US 6,147,138) in view of Podszun (CA 2371181) and Beaman (US 5,352,405);

(b) Claim 35 under 35 U.S.C. §103(a) over Hochsmann in view of Podszun and Beaman and further in view of Kar (US 2001/0002287);

(c) Claim 41 under 35 U.S.C. §103(a) over Hochsmann in view of Podszun and Beaman and further in view of Melisaris (US 6,413,697) and Kawasaki (US 4,317,766);

(d) Claims 43, 48, and 49 under 35 U.S.C. §103(a) over Hochsmann in view of Podszun and Beaman and further in view of Bredt (US 2001/0050031);

(e) Claim 47 under 35 U.S.C. §103(a) over Hochsmann in view of Podszun and Beaman and further in view of Melisaris-2 (US 6,177,232),

are respectfully traversed.

The claimed invention is represented by independent Claim 28, which provides:

> A process for producing a three-dimensional object comprising
> a) providing a layer of a pulverulent substrate comprises a polymer, wherein the polymer is a homo- or copolymer preferably selected from the group consisting of polyester, polyvinyl chloride, polyacetal, polypropylene, polyethylene, polystyrene, polycarbonate, polybutylene terephthalate, polyethylene terephthalate, polysulfone, polyarylene ether, polyurethane, thermoplastic elastomers, polylactides, polyoxyalkylenes, poly(Nmethylmethacrylimides) (PMMI), polymethyl methacrylate (PMMA), ionomer, polyamide, copolyester, copolyamides, silicone polymers, terpolymers, acrylonitrilebutadiene-styrene copolymers (ABS), and mixtures thereof

> b) controlling the temperature of a manufacturing chamber by supplying heat to said layer to bring said layer to an elevated temperature or to maintain said layer at an elevated temperature below the melting or sintering temperature of the polymer in said pulverulent substrate
>
> c) selectively applying an absorber in a suspension or a liquid absorber via an inkjet process to a region to be sintered
>
> d) applying other specific liquids or suspensions with certain properties
>
> e) selectively melting regions of the layer of the pulverulent substrate by introducing electromagnetic energy via a laser of wavelength from 100 to 3000 nm
>
> f) cooling the molten and non-molten regions to a temperature which allows the moldings to be removed intact
>
> g) removing the moldings.

In the Office Action, paragraphs 1-52 are verbatim recitations of paragraphs 1-52 set forth in the Office Action mailed December 23, 2010. On page 15 of the Office Action the Examiner presents the only new content, which is a response to the arguments presented on April 25, 2011.

Specifically, the Examiner provides the following statement:

> a. In Hochsmann the particles are not melted, whereas in applicant's invention the particles are melted as claimed in step (e). However, Hochsman forms composite particles (see Hochsmann claim 1) and melts the surface portion of the composite particles. Step (e) does not differentiate between partial melting of the particles and complete melting of the particles. Therefore, the melting of the surface portion of the composite particles in Hochsmann reads on the required "selectively melting regions of the layer of the pulverant substrate" of applicant's step (e). It should be pointed out that the "comprises a polymer" limitation of step (a) is inclusive and does not exclude composite particles having an inorganic core and a polymer coating.
>
> b. Podszun, Beaman and the other secondary references do not teach certain aspects of the invention. However, each of these secondary references are only relied on to teach aspects of the invention of which Hochsman is deficient; these secondary references are not relied on to teach the aspects of the invention that are taught by Hochsmann as described in the outstanding rejection.

The Examiner's position is that Hochsmann disclose all the limitations, either explicitly or implicitly, of the claims but for the material modifier, the wavelength of the

radiation source, the use of a laser, and the heating step (b). With respect to the first three deficiencies, the Examiner cites Podszun. However, the Examiner acknowledges that Podszun fails to disclose the heating step (b). The Examiner refers to Beaman for this heating step.

Applicants maintain that the Examiner's alleged obviousness rejection is premised upon a mistaken understanding of the process of Hochsmann. Hochsmann disclose a selective laser sintering method. As a disadvantage, Hochsmann states that a relatively large amounts of binder material must be supplied (column, 1, lines 55-58). As a result, the binder material would then result in considerable disadvantages in the finished component (column, 1, lines 66-67). Indeed, inclusion of the large amounts of binder material would develop in the finished model, thus contaminating and possibly weakening the finished component. Hochsmann overcame this problem by:

1) coating all particles with a binder (Claim 1 (a));

2) using a three-component system by including a "moderating agent";

3) using the binder for consolidating the particles; and

4) only the binder reacts or is melted / liquefied (column 2, lines 26-30 and column 4, lines 40-44).

The process of Hochsmann is quite distinct from the claimed invention which utilizes a two-component system. More importantly, in Hochsmann only the binder reacts or is melted / liquefied. In Hochsmann, the particles are not melted. However, in the claimed invention it is specifically required that the particles are melted (see (e)).

In point (a) above, the Examiner disputes these points. First, the Examiner disputes the position that in Hochsmann the particles are not melted. The Examiner points to Claim 1 and argues that Hochsmann disclose the formation of composite particles and subsequent melting of the surface portion of these particles. Second, the Examiner points to step (e) of

the claimed invention as not distinguishing between partial melting and complete melting of the particles and, thus, the surface melting in Hochsmann allegedly meets this claim limitation.

It appears that in the process described by Hochsmann, it is the moderating agent applied to the surface of the composite particle that actual melts upon application of the specific energy for solidifying the composite material from an original value to a discrete other value (see col. 4, lines 40-44). Thus, the Examiner's interpretation relies upon a broad interpretation of the claim limitation "pulverulent substrate comprises a polymer" as reading upon a "composite particles having an inorganic core and a polymer coating" as used in Hochsmann.

With the amendment herein, the propriety of this allegation (which Applicants do not conceded) is moot. Specifically, in the present invention only polymers or copolymers are used as pulverulent substrate. In contrast thereto, Hochsmann disclose a material based on two components (particles precoated with binder). Also, Podszun et al disclose the use of a material based on a mixture of polymer and absorber. It is an advantage of the present invention to use only polymers and to add the absorber selectively in order to reduce the amount of absorber, since only the regions to be melted are coated with an absorber, and not the complete pulverulent substrate has to include it.

Moreover, as stated above, Hochsmann is also silent with respect to the use of a material modifier, the wavelength of the radiation source, the use of a laser, and the heating step (b). The Examiner maintains that Podszun compensates for the first three deficiencies, while Beaman provides the heating step (b). Applicants maintain for that for the reasons set forth in the responses filed on May 12, 2010, and April 25, 2011, Podszun and/or Beaman fail to compensate for the deficiencies in Hochsmann contrary to the Examiner's allegations otherwise in point (b) above.

Podszun has already been discussed in detail in the previous responses. Podszun disclose a process that does not provide any selectively applied absorber. Further, input of energy over a surface, with the effect of selective melting, is not described in Podszun. In this method, the laser must continue to be guided selectively over the zone to be melted. Complex optics and more time is needed for this purpose. Thus, an unexpected effect of the present invention, vis-à-vis Podszun, is that selectivity can be achieved merely by printing an absorber instead of via selective focused application by means of a laser (meaning that focusing of the laser is not necessary). Thus, the claimed invention makes the forming of three-dimensional articles faster and less expensive as complex optics for focusing are not necessary. Beaman suffers similar defects as Podszun and does not compensate for the aforementioned deficiencies in the disclosure of Hochsmann.

In point (b) on page 15 of the Office Action the Examiner alleges that each of the secondary references (including Podszun and Beaman) are only relied on to teach aspects of the invention of which Hochsman is deficient. However, even if the artisan were to refer to the secondary references, the claimed invention would not be the result. Indeed, in Podszun selectivity is adjusted by a laser. The wavelength of this laser is not absorbed by the plastic powder, and so addition of an absorber is also necessary. In this case the entire powder contains the absorber, and so the absorber is not used selectively. Podszun also discloses why lasers with low wavelengths cannot be used, specifically because the standard plastics do not exhibit any absorption in these regions. The addition of the IR absorber can be carried out in various ways. For example, the plastic and the IR absorber can be mixed in molten condition in an extruder, and the resulting extrudate can be ground to the desired particle size. However, another option is to add the IR absorber as early as the polymerization stage during production of the plastic. This is fundamentally different from the method of the presently claimed invention, in which an absorber in the form of a suspension or of a liquid absorber is

applied selectively on the areas to be sintered by means of an ink-jet method.

Podszun discloses a method for production of a three-dimensional object, which method comprises:

a) preparing a layer of a pulverulent substrate containing an absorber,

b) selectively melting areas of the powder layer by means of inputting electromagnetic energy having a wavelength of between 500 nm and 1500 nm

c) removing the shaped article.

The present invention differs from the disclosure of Podszun in that:

(i.) the absorber in the form of a suspension or liquid is applied selectively on the areas to be sintered by means of an ink-jet method.

Thus, Podszun is not applicable to the invention as claimed. Further, Beaman suffers similar defects as Podszun. In particular, Beaman fails to disclose or suggest the input of energy over a surface, with the effect of selective melting. Thus, Beaman does not compensate for the aforementioned deficiencies in the disclosure of Hochsmann.

Moreover, none of Kar, Melisaris, Kawasaki, Bredt, or Melisaris-2 cure this basic deficiencies in the combined disclosures of Hochsmann, Podszun and Beaman. Therefore, even when Hochsmann, Podszun and Beaman are viewed together with Kar, Melisaris, Kawasaki, Bredt, and/or Melisaris-2, the claimed invention would still not be obvious.

Withdrawal of these grounds of rejection is requested.

Finally, Applicants respectfully request that the provisional obviousness-type double patenting rejections of Claims 28-30, 36-43, and 45-50 over Claims 28-29 and 35-49 of co-pending U.S. 11/587,758 in view of Beaman be held in abeyance until an indication of allowable subject matter in the present application. If necessary, a terminal disclaimer will be

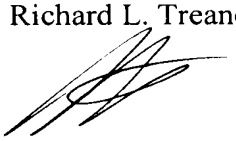
filed at that time. Until such a time, Applicants make no statement with respect to the propriety of this ground of rejection.

However, the Examiner is reminded that MPEP §804 indicates that: "If "provisional" ODP rejections in two applications are the only rejections remaining in those applications, the examiner should withdraw the ODP rejection in the earlier filed application thereby permitting that application to issue without need of a terminal disclaimer."

Applicants submit that the present application is now in condition for allowance. Early notification of such action is earnestly solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, L.L.P.
Richard L. Treanor



Vincent K. Shier, Ph.D.
Registration No. 50,552

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413-2220
(OSMMN 08/03)